



SECTION 1018

FLY ASH FOR CONCRETE

1018.1 Scope. These specifications cover fly ash intended for use in concrete.

1018.2 General. Only fly ash from sources qualified in accordance with these specifications will be permitted. The mixing of different classes and sources of fly ash will not be permitted. All fly ash shall conform to the requirements of AASHTO M 295, Class C or F, except as herein specified.

1018.2.1 The available alkalis, as Na_2O , shall not exceed 1.5 percent. Loss on ignition shall not exceed 1.5 percent.

1018.2.2 The percent each of Silicon Dioxide (SiO_2), Aluminum Oxide (Al_2O_3) and Iron Oxide (Fe_2O_3) shall be reported in addition to the total of the three.

1018.2.3 The term "manufacturer", as used in this specification, is the actual manufacturer of the fly ash. The term, "marketing entity", as used in this specification, is the supplier or broker of the fly ash. The marketing entity shall be responsible for complying with these specifications.

1018.2.4 Cement used by the marketing entity for testing fly ash shall meet the requirements of AASHTO M 85.

1018.2.5 All tests shall be performed in a MoDOT approved laboratory.

1018.3 Sampling, Testing and Acceptance Procedures. All marketing entities and terminals furnishing fly ash to MoDOT projects shall be qualified as herein described. All fly ash shall be subject to inspection and sampling by MoDOT at the power plant, an intermediate shipping terminal or destination. MoDOT shall be allowed free access to all facilities and records as required to conduct inspection and sampling.

1018.3.1 Marketing Entity Qualification. In order to become qualified, a written request shall be sent by the marketing entity to the Division Engineer, Materials, along with a copy of their QC plan and the following information. In order to maintain qualification, the marketing entity shall submit additional information, as listed, to MoDOT. The power plant and terminals may be inspected to verify the information and to establish personal contact with the QC personnel.

1018.3.1.1 The following information shall be included in the request for qualification.

(a) An outline of the QC program from the coal yard to the point where the product is relinquished to the purchaser. The QC program shall cover all tests required by the specification and include the testing frequency for each test. The name of the testing laboratory shall be included.

(b) A copy of the testing laboratory's most recent Cement and Concrete Reference Laboratory (CCRL) inspection report and the latest CCRL proficiency sample report. The

CCRL inspection shall cover all tests required by the specification. Documentation showing satisfactory resolution of all inspection deficiencies shall be included.

(c) Complete name and address of the fly ash source and owner. If located in an area without precise address identification, a complete map description shall be furnished.

(d) Complete name and address or map location of the coal mine. If more than one source of coal is used, all sources shall be listed.

(e) Type of coal used.

(f) Class of fly ash produced.

(g) A description of production procedures including, but not limited to, any additives mixed with the coal during production, any additive or dust suppressant used to collect the fly ash, ash collection methods, production capacity in tons (megagrams) per day and the proportions and proportioning procedures of any blended coals.

(h) Description of storage facilities, including capacities and set-aside capabilities.

(i) A copy of a typical bill of lading with the required certification statement.

(j) A split sample of the class of fly ash proposed for use, obtained from the autosampler over a minimum of one production day. If the fly ash is manually sampled, the split sample shall consist of a composite of 100 gram samples taken where directed by MoDOT, every hour over a minimum of one production day. The marketing entity's test results for the split sample shall also be submitted.

1018.3.1.2 In order to maintain qualification, the following is required.

(a) Monthly QC test results covering the production of all fly ash proposed for use in MoDOT projects, including the high, low and average results for each class shall be forwarded to MoDOT, no later than two weeks following the end of the period covered by the report, with the exception of the alkali test results which shall be submitted quarterly. The report shall consist of, but is not limited to, results from the following tests.

(b) A sample shall be tested for each 400 tons (400 Mg) intended for use. The sample shall be tested by the marketing entity for fineness, No. 325 (425 μ m) sieve analysis, moisture content, specific gravity and loss of ignition.

(c) The marketing entity shall perform complete chemical and physical tests on a composite of the samples representing each silo or for each 3000 tons (3000 Mg) intended for use.

(d) A copy of the most recent CCRL inspection and proficiency sample reports and any deficiency resolutions shall be forwarded promptly to MoDOT.

(e) Quarterly split samples for the class of approved fly ash will be obtained by MoDOT for joint testing by the marketing entity. Marketing entity test results on the split samples shall be furnished to MoDOT when completed.

(f) All QC test results shall be available for a minimum of three years, for MoDOT review upon request.

(g) No fly ash out of specification shall be allowed into a silo destined for MoDOT projects.

1018.3.2 Terminal Qualification. In order to become a qualified terminal, a written request shall be sent from terminal personnel to the Division Engineer, Materials. The request shall be accompanied by a letter from each affected and qualified marketing entity, advising of the intent to ship through the respective terminal. Any changes in fly ash source shall be updated in the same manner. Terminals will be inspected to ensure adequacy to accept, retain and ship fly ash from qualified marketing entities.

1018.3.3 Failure to Comply. Failure to fulfill any of these requirements may result in disqualification of the fly ash manufacturer, marketing entity or a terminal. If a manufacturer is disqualified, all terminal shipped fly ash originating from that manufacturer will automatically and immediately be disqualified also. If a marketing entity is disqualified, all fly ash handled or brokered by that entity may be disqualified until the issue is resolved, regardless of the manufacturer. If a terminal is disqualified, all fly ash shipped from that terminal may be disqualified until the issue is resolved, regardless of the manufacturer. In cases of dispute, test results obtained by MoDOT will be considered referee and final.

1018.3.4 Disqualified Facilities. If a facility has been disqualified, the marketing entity will be required to designate the silo, bin or storage facility from which they propose to furnish fly ash for MoDOT projects. Each silo, bin or storage facility designated must be sampled, tested, sealed and approved by MoDOT prior to shipment. The marketing entity shall also sample, test and report the test results for each designated silo, bin or storage facility. This procedure will continue until adequate QC has been established.

1018.3.5 Fly ash continually sampled and tested via autosamplers at a location, frequency and duration acceptable to MoDOT, may be continuously shipped direct from a marketing entity or generating station silo. Fly ash manually sampled and tested shall be held in the silo or bin until such time as the test results are completed prior to shipping.

1018.3.6 Fly ash from each coal source at each plant shall be qualified separately. Coals from different sources may be blended prior to burning, but the qualification must be based on the blend.

1018.3.7 When the production procedure or fuel source is changed, or when any change is made by the manufacturer that alters the properties or characteristics of the qualified fly ash, requalification may be required.

1018.3.8 All fly ash intended for use shall be sampled, tested and placed in a designated silo or bin. The designated silo or bin shall have a capacity of no less than 1000 tons (1000 Mg) or two days production, whichever is larger.

1018.4 Acceptance. It shall be the responsibility of the marketing entity to guarantee by certification the material complies with the specification requirements. When a qualified marketing entity or terminal is shipping fly ash for, or purchasing fly ash from, another qualified marketing entity, the bill of lading or delivery receipt shall be from the shipping company. The certification statement showing the actual manufacturer shall be prominently placed on the bill of lading or delivery receipt. A copy of the bill of lading or delivery receipt shall accompany each shipment and shall be furnished to MoDOT at the shipping and destination points.

1018.4.1 The bill of lading or delivery receipt for each shipment to MoDOT projects shall carry the following certification statement:

"This is to certify this Class ____ fly ash originated from a MoDOT qualified manufacturer, has been maintained to meet MoDOT specifications and was loaded from silo number _____."

Name and Location of Manufacturer

Name and Location of Shipping Facility

By_____
Signature and Name of Marketing Entity